Key

Geo B Exam Review

Multiple Choice

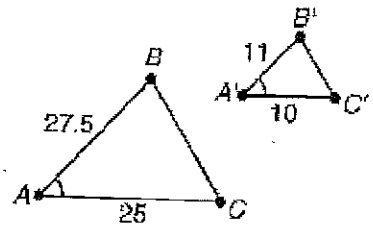
Identify the choice that best completes the statement or answers the question.

A 1. If two polygons are SIMILAR, then the corresponding sides must be _____.

(a.) proportional
b. congruent
c. parallel
d. similar

D 2. This drawing illustrates _____.

$\frac{27.5}{11} = 2.5$ $\quad \frac{25}{10} = 2.5$

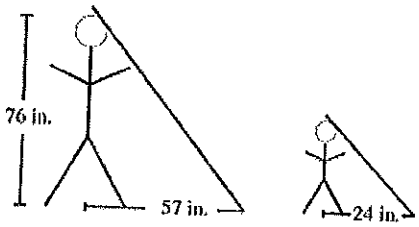


a. AA Similarity
b. SAS Congruence
c. SSS Similarity
(d.) SAS Similarity

B 3. At the same time of day, a man who is 76 inches tall casts a 57-inch shadow and his son casts a 24-inch shadow. What is the height of the man's son? (Figures may not be drawn to scale.)

a. 33 in.
(b.) 32 in.
c. 81 in.
d. 108 in.

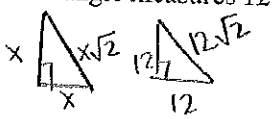
$\frac{\text{Height}}{\text{Shadow}} \quad \frac{76}{57} \nearrow \frac{x}{24}$



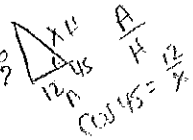
$\frac{57x}{57} = \frac{1824}{57} \quad x = 32$ in

C 4. One leg of a 45°-45°-90° triangle measures 12 centimeters. What is the length of the hypotenuse?

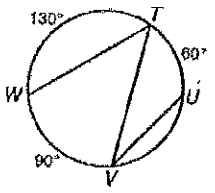
a. $4\sqrt{3}$ cm
b. $6\sqrt{2}$ cm
(c.) $12\sqrt{2}$ cm
d. $12\sqrt{3}$ cm



OR SOH CAH TOA



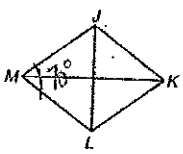
B 5. What is $m\angle WTV$?



$\frac{1}{2}90 = 45°$

a. 30°
(b.) 45°
c. 60°
d. 90°

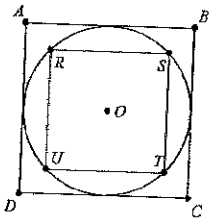
A 6. $JKLM$ is a rhombus. If $m\angle JML = 70°$, what is the value of $m\angle JKM$?



$70/2 = 35$

(a.) 35°
b. 55°
c. 70°
d. 110°

B 7. Describe the relationship between the area of circle O, the area of quadrilateral $ABCD$, and the area of quadrilateral $RSTU$.



a. The area of $\odot O$ is greater than the area of $ABCD$. The area of $ABCD$ is greater than the area of $RSTU$.
(b.) The area of $ABCD$ is greater than the area of $\odot O$. The area of $\odot O$ is greater than the area of $RSTU$.
c. The area of $\odot O$ is equal to the area of $ABCD$. $RSTU$ has the least area.
d. The area of $\odot O$ is equal to the area of $RSTU$. $ABCD$ has the greatest area.

B 8. A town has an area of 10.4 mi^2. The town's population is 3619. What is the population density of the town? Round your answer to the nearest whole number.

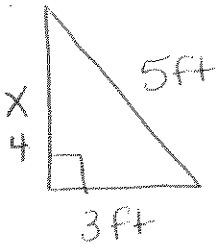
a. 362 people/mi^2
(b.) 348 people/mi^2
c. 1122 people/mi^2
d. 37,368 people/mi^2

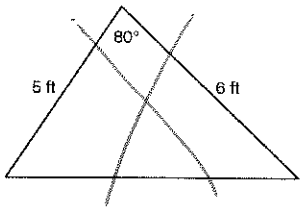
pop density = $\frac{\text{pop}}{\text{area}}$ = $\frac{3619}{10.4}$ = 348

___ 9. Find the area of the triangle.

$3^2 + x^2 = 5^2$
$9 + x^2 = 25$
$-9 \quad -9$
$\sqrt{x^2} = \sqrt{16}$
$x = 4$

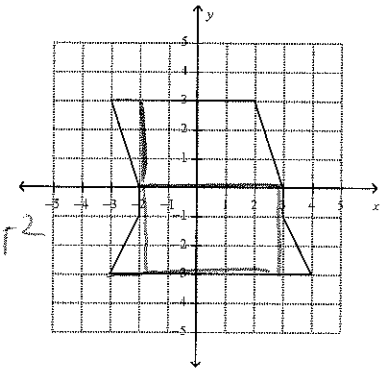
$A_\Delta = \frac{1}{2}bh$
$= \frac{1}{2}(3)(4)$
$= 6\ ft^2$





A 10. A home owner wants to make a new deck for his backyard. Redwood costs \$5 per square foot. The units on the graph are in feet. How much will it cost to create the deck shown?

(a.) \$160
b. \$38
c. \$200
d. \$190



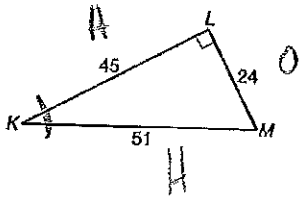
A_{para}: ~~$\frac{1}{2}bh$~~ $bh = 5(3) = 15\ ft^2$
$A_{rect} = bh = 5(3) = 15\ ft^2$
$A_\Delta = \frac{1}{2}bh = \frac{1}{2}(1)(2) = 1\ ft^2$
$A_\Delta = \frac{1}{2}bh = \frac{1}{2}(1)(2) = 1\ ft^2$

$15+15+1+1 = 32\ ft^2$
$32 \times 5 = \$160$

SOH CAH TOA $\tan K = \frac{O}{A} = \frac{24}{45} = \frac{8}{15}$

B 11. What is tan K?

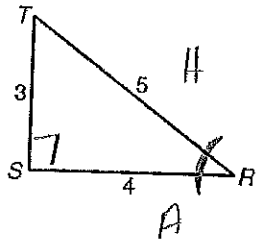
a. $\frac{8}{17}$
b. $\frac{8}{15}$
c. $\frac{15}{17}$
d. $\frac{15}{8}$



C 12. Which is equal to the cosine of $\angle R$?

a. 0.6
b. 0.75
c. 0.60
c. 0.8
d. 1.25

$\cos R = \frac{A}{H} = \frac{4}{5} = 0.8$



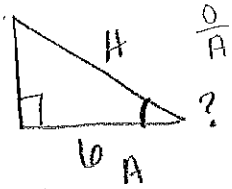
13. Write cos 16° in terms of the sine.

a. sin 164°
b. sin 74°
c. sin 84°
d. sin 16°

B 14. A skateboard ramp is 3.5 feet high and 6 feet long along the horizontal. To the nearest degree, what is the measure of the angle that the ramp makes with a horizontal line?

a. 27°
b. 30°
c. 60°
d. 63°

O 3.5



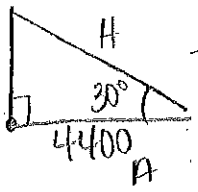
$\frac{O}{A}$ $\tan^{-1}$ $\tan^{-1}(\tan x) = \tan^{-1}(\frac{3.5}{6})$

$x = 30.3°$

B 15. A camera is mounted at a point 4,400 ft from the base of a rocket launching pad. Assuming the rocket rises vertically, what is the height of the rocket from its base when the camera angle is 30°? Round your answer to the nearest foot.

a. 3,811 ft
b. 2,540 ft
c. 7,621 ft
d. 2,200 ft

O X

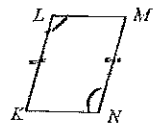


$\tan 30 = \frac{x}{4400}$

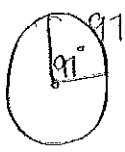
$4400 \cdot \tan 30 = x$

$2540.34 = x$

A 16. $\overline{KL} \cong \overline{MN}$ and $\angle KLM \cong \angle MNK$. Determine if the quadrilateral must be a parallelogram. Justify your answer.



a. No. Only one set of angles and sides are given as congruent. The conditions for a parallelogram are not met.
b. Yes. Opposite angles are congruent to each other. This is sufficient evidence to prove that the quadrilateral is a parallelogram.
c. Yes. Opposite sides are congruent to each other. This is sufficient evidence to prove that the quadrilateral is a parallelogram.
d. Yes. One set of opposite sides are congruent, and one set of opposite angles are congruent. This is sufficient evidence to prove that the quadrilateral is a parallelogram.



360 − 97 = 263°

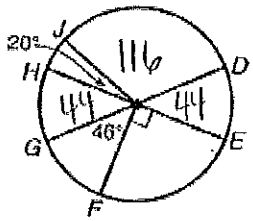
D 17. The central angle of a circle measures 97° and intercepts a minor arc. What is the measure of its major arc?

a. 83°
b. 97°
c. 187°
d. 263°

B 18. Which of these arcs has a measure of 134°?

a. $\overset{\frown}{FJ} = 110^\circ$
b. $\overset{\frown}{DF} = 134$
c. $\overset{\frown}{EG} = 136$
d. $\overset{\frown}{DH}$

44 + 90 = 134



180 − 90 − 46 = 44°

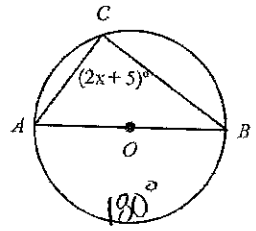
180 − 20 − 44 = 116

A 19. Solve for x.

$2x + 5 = \frac{1}{2}(180)$

a. $x = 42.5$
b. $x = 90$
c. $x = 87.5$
d. $x = 27.5$

$2x + 5 = 90$
$-5 \quad -5$
$\frac{2x}{2} = \frac{85}{2}$
$x = 42.5$

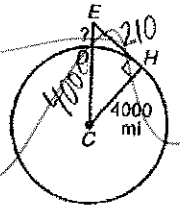


A 20. A mountain climber is standing at the top of Mount Everest. The distance from the summit to the horizon is about 210 miles. About how high is Mount Everest?

a. 5.5 mi
b. 11 mi
c. 210 mi
d. 8000 mi

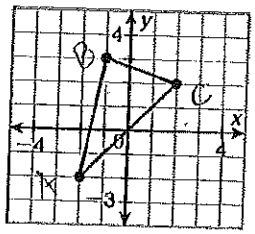
$4000^2 + 210^2 = CE^2$
$16044100 = CE^2$
$4005.51 = CE$

$4005.51 - 4000 = 5.5$ mi



C 21. Find the perimeter of the triangle to the nearest whole unit.

a. 18
b. 16
c. 14
d. 12



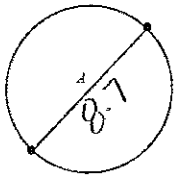
A(−2, −2)
B(−1, 3)
C(2, 2)

$AB = \sqrt{(3+2)^2 + (-1+2)^2} = \sqrt{5^2 + 1^2} = \sqrt{26}$
$BC = \sqrt{(2-3)^2 + (2+1)^2} = \sqrt{-1^2 + 3^2} = \sqrt{10}$
$CA = \sqrt{(2+2)^2 + (2+2)^2} = \sqrt{4^2 + 4^2} = \sqrt{32}$

$\sqrt{26} + \sqrt{10} + \sqrt{32} = 13.9 \approx 14$

C 22. The diameter of circle A is 8.7 units. Find the circumference of the circle.

a. 17.4π units
b. 75.69π units
c. 8.7π units
d. 26.1π units



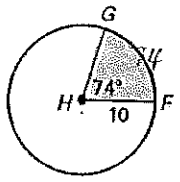
$C = 2\pi r$ or $C = \pi d$

Area Sector $= \frac{\theta}{360}\pi r^2$

$= \frac{74}{360}\pi 10^2 = 64.58$

A 23. What is the area of sector formed by $\angle FHG$ to the nearest hundredth?

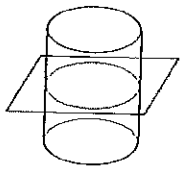
(a.) 64.58
b. 129.15
c. 314.16
d. 232.48



24. part B What is the length of GF? Arc length $= \frac{\theta}{360} 2\pi r$

$= \frac{74}{360} 2\pi(10) = 12.92$

A 25. Describe the cross section.

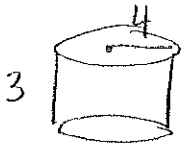


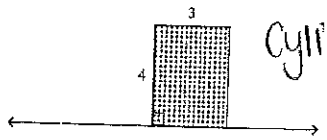
(a.) The cross section is a circle.
b. The cross section is a cylinder.
c. The cross section is a plane.
d. The cross section is a parallelogram.

D 26. Find the volume of the solid generated by rotating the figure around the given axis. If necessary, use 3.14 for π and round your answer to the nearest hundredth.

a. 301.44 cubic units
b. 113.04 cubic units
c. 96 cubic units
(d.) 150.72 cubic units

$V = \pi r^2 h = \pi 4^2 (3)$
$= 150.8$





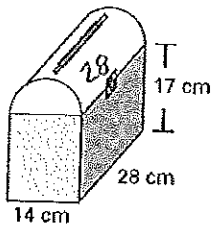
C 27. A lunch box consists of half of a cylinder placed on top of a rectangular prism. What the is the volume of the lunch box?

a. 2155 cm^3
b. 4310 cm^3
(c.) 8819 cm^3
d. 10,974 cm^3

$V_{cyl} = \pi r^2 h = \pi 7^2 (28) = \frac{4310.27}{2} = 2155.13$ $14/2 = 7$

$V_{prism} = lwh = 14(28)(17) = 66664$

$2155.13 + 66664 = 88819.13$



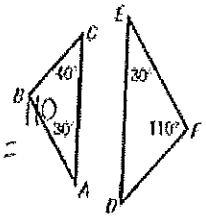
Short Answer

28. Tell whether each pair of triangles is similar. Explain your reasoning.

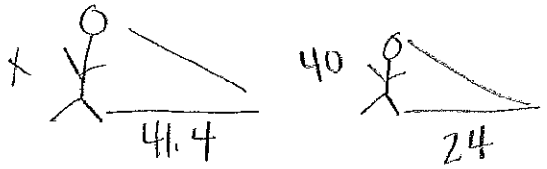
$\triangle ABC \sim \triangle EFD$

by AA similarity

$180 - 40 - 30 = 110$



29. Standing next to each other, a woman casts a 41.4-inch shadow and her 40-inch-tall son casts a 24-inch shadow. What is the height of the woman to the nearest inch?

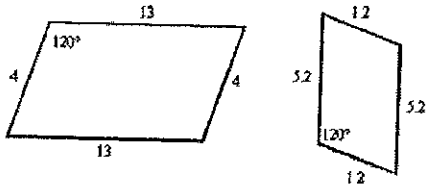


height / shadow $\quad \frac{x}{41.4} \times \frac{40}{24}$

$24x = 41.4(40)$

$\frac{24x}{24} = \frac{1656}{24}$ $\quad 24x = 69$ in

30. Determine whether the figures are similar. Explain.

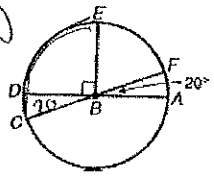


$\frac{4}{12} = \frac{13}{5.2}$

$0.3\overline{3} \neq 2.5$ Not similar

The two figures are not similar, because the sides are not proportional.

31. Find $m\overset{\frown}{CDE}$.



$20 + 90 = 110°$

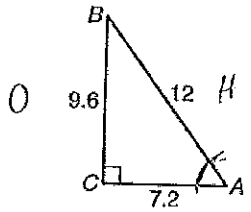
32. Which angle of $\triangle ABC$ has a sine of 0.8?

SOH

O/H

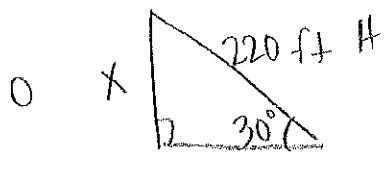
$\sin A = \frac{9.6}{12} = 0.8$

angle A



33. A 220 ft string attached to a kite makes a 30° angle with the ground. What is the height of the kite to the nearest tenth?

O/H

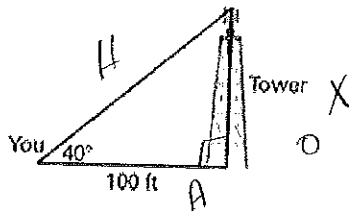


$\sin 30 = \frac{x}{220}$

$220 \sin 30 = x$

$x = 110$ ft

34. You want to find the height of a tower used to transmit cellular phone calls. You stand 100 feet away from the tower and measure the angle of elevation to be 40°. How high is the tower?

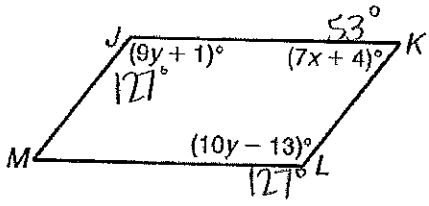


O/A TOA

$\tan 40 = \frac{X}{100}$

$100 \tan 40 = X$ $X = 83.91$ ft

35. Show that $JKLM$ is a parallelogram for $x = 7$ and $y = 14$.



$9(14)+1 = 127$

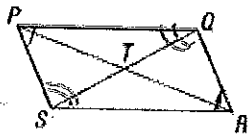
$10(14)-13 = 127$

$7(7)+4 = 53$

$127+53 = 180°$

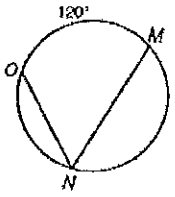
JKLM is a parallelogram because $\angle K$ is supplementary to both of its consecutive angles

36. $\angle SPQ \cong \angle QRS$ and $\angle PQR \cong \angle RSP$. Is $PQRS$ a parallelogram? Explain.



Yes, both pairs of opposite angles are congruent

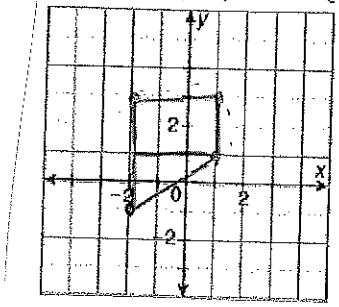
37. Find $m\angle MNO$.



$m\angle MNO = \frac{1}{2}(120)$

$= 60°$

38. Find the area of the polygon with vertices $A(-2,-1)$, $B(-2,3)$, $C(1,3)$, and $D(1,1)$.



Area $= bh = 3 \cdot 2 = 6$ units^2

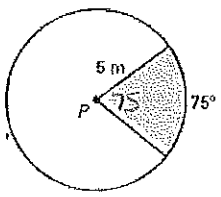
$A_\Delta = \frac{1}{2}bh = \frac{1}{2}(2)(3) = 3$ units^2

$6+3 =$ 9 units^2

39. Find the area of the shaded region.

Area sector $= \frac{\theta}{360}\pi r^2$

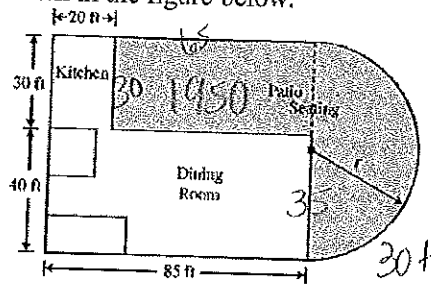
$\frac{75}{360}\pi 5^2 = 16.4$



85-20 = 65

40. A restaurant has a concrete patio with a semicircular end, as shown in the figure below.

What is the area of the patio, in square feet?



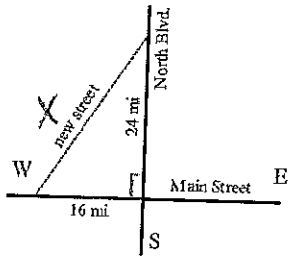
$30 \times 65 = 1950$

$\pi r^2 = \pi(35)^2 = \frac{3848.45}{2} = 1924.23$

$1950 + 1924.23 = 3874.23\ ft^2$

30+40 = 70/2 = 35

41. A new street is going to be constructed to connect Main Street, which runs in the east-west direction, and North Boulevard, which runs in the north-south direction, as shown in the diagram below. The construction cost has been estimated at $580,000 per mile, excluding the new intersections.



Part A: What type of triangle is bounded by the new street, North Boulevard, and Main Street? How do you know?

Right triangle Main St & North Blvd are ⊥ to each other

Part B: Let x represent the length of the new street. What is the name of the formula that can be used to find the value of x? Use that formula to write an equation that can be solved for x.

Pythagorean theorem $a^2 + b^2 = x^2$ $16^2 + 24^2 = x^2$

Part C: What is the length of the new street to the nearest mile?

$256 + 576 = x^2$

$\sqrt{832} = \sqrt{x^2}$ $x = 28.8 \approx 29$ miles

Part D: Estimate the cost of constructing the new street. Show your work. ($580,000 per mile)

$29 \times 580{,}000 = \$16{,}820{,}000$

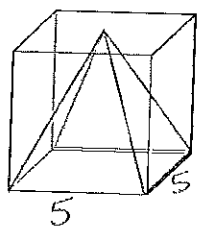
42. A square pyramid is inscribed in a cube with an edge length of 5 units, as shown.

Part A: Find the volume of the prism. $V_{prism} = lwh = 5 \cdot 5 \cdot 5 = 125$

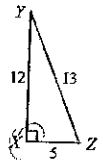
Part B: Find the volume of the pyramid. $V_{py} = \frac{1}{3}lwh = \frac{1}{3} 5 \cdot 5 \cdot 5 = 41.7$

Part C: Find the ratio of the volume of the pyramid to the volume of the prism.

$\frac{Py}{Prism}$ $\frac{41.7}{125} = 0.33$



43. Prove that $\angle YXZ$ is a right angle.



$5^2 + 12^2 = 13^2$

$25 + 144 = 169$

$169 = 169$

$\angle YXZ$ is a right angle

44. On circle R, $m\overset{\frown}{QT} = m\overset{\frown}{TS} = 120°$. Find $m\angle QRS$ and $m\angle QTS$. Explain each step of your solution.

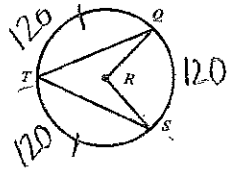


Figure not drawn to scale.

$360 - 120 - 120 = 120$

Arc addition

$m\angle QRS = 120°$

Central angles & corresponding intercepted arc are $=$

$m\angle QTS = \frac{1}{2}(120) = 60°$

inscribed angle thm.